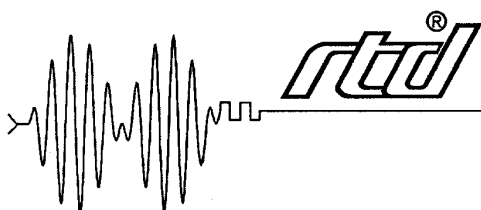


CANSPIDER

User's Manual

Hardware Revision 1.0B



Real Time Devices, Inc.

"Accessing the Analog World"®

CANSPIDER

Active 4-Port CAN Hub

User's Manual

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Notice: We have attempted to verify all information in this manual as of the publication date. Information in this manual may change without prior notice from RTD Finland Oy.

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Chapter 1 INTRODUCTION

This manual provides information on the CANSPIDER active CAN bus hub. The CANSPIDER can connect up to four fiberoptic ECAN527-2 PC/104 CAN bus interface boards together. Other CAN bus devices may be connected to the galvanically isolated twisted pair CAN port. This structure enables flexible expansion of CAN Spiders as well as connection of twisted pair CAN devices to your network.

ECAN527-2

The ECAN527-2 is a single channel CAN bus interface module for PC/104 systems. This board features the Intel CAN 2.0B compliant controller AN82527. The fiberoptic interface is integrated onboard. Fiberoptic network cables can be directly wired to the ECAN527-2 and the CANSPIDER using the Hewlett Packard "VersaLink" cabling system.

Features

The following are major features of the CANSPIDER:

- Fiberoptic CAN Ports with data rates up to 1 Mbps
- One galvanically isolated twisted pair CAN port for system expansion
- Onboard bus termination resistors
- Onboard power supply with 8-40 VDC input range
- Power outputs include +5V and isolated +5V

Connectors

Connectors provided are:

- J11: Power supply input 8-40V
- J3: +5V output from onboard power converter
- J2: Isolated +5V output from onboard DC/DC converter
- J5: 10-pin Header for twisted pair CAN bus
- FIBER: 4 Fiberoptic CAN ports with 2 transceivers each

General Specifications

- Dimensions: 3.8 x 3.9 x 0.6" (97 x 100 x 16 mm)
- Weight (mass): To be defined
- Physical: 2-layer PCB
- Operating conditions:
 - Standard temperature: 0 to + 70 degrees C
 - Extended temperature: -40 to + 85 degrees C
 - Relative humidity: 0 to 95%, non-condensing
 - Storage temperature: -55 to +85 degrees C

Chapter 2 CONNECTING THE CAN SPIDER

The following sections contain information on configuring the CANSPIDER.

Please read this entire section before attempting to use the module!

Jumpers

One jumper configures the following function:

- CAN Bus Termination Jumper

Jumper options

The CANSPIDER is delivered from the factory configured according to the following table.

Default Jumper Settings		
Jumper	Setting	Function
X9	1-2	CAN bus terminated

For most applications, you will not have to change this setting. If you do, refer to the following pages for details on correct settings.

Locations

The figure below shows jumper locations.



Descriptions

The following table describes the function of this jumper:

Jumper	Use
X9	Connects or Disconnects a 120 Ohm onboard CAN-bus termination resistor
1-2:	No bus expansion, CAN bus terminated with 2 termination resistors onboard
Disconnected:	Only one onboard 120 Ohm resistor terminates the bus
Default: 1-2,	Bus termination connected

The CANSPIDER converts four fiberoptic CAN ports into a galvanic CAN bus. The galvanic CAN bus is implemented with traces on the Spider board. Therefore bus termination must be performed to make the network operate correctly. If no other CAN devices are connected, the CANSPIDER and the onboard CAN bus must be terminated at both ends of the physical bus. To do that you should close jumper X9.

Fiberoptic CAN Ports

Four fiberoptic RTD CAN-boards can be connected to the RTD CANSPIDER. Each port consists of a separate transmitter and receiver. The ECAN527-2 board also features a separate fiberoptic transmit and receive transceiver.

To connect your ECAN527-2 to the CANSPIDER you should use the correct fiberoptic cable. Failure to do so may result in unreliable or degraded network operation. We recommend you to purchase the SK-CAN-FIBER starter kit when you are evaluating and testing your system. The correct ready-made duplex cables can be purchased from RTD. The factory recommended Hewlett Packard cable part number is HFBR-END-XXX (where XXX is the cable length). The SK-CAN-FIBER includes 2 of the HFBR-END-002 (2 meter cable length).

The ECAN527-2 as well as the CANSPIDER uses the following transceivers:

Transmitter: HFBR-1522

Receiver: HFBR-2522

These parts support a 1Mbd data rate with cable lengths up to 45 meters. For more detailed information on the fiberoptic performance please visit the Hewlett Packard website at:

www.hp.com/HP-COMP/fiber/hfbr0501.htm

NOTE: The fiberoptic transceivers are classified as IEC 825-1 Accessible Emission Limit (AEL) Class 1 based upon the current proposed draft scheduled to go to effect on January 1, 1997. AEL Class 1 LED devices are considered eye safe. For more information please contact your local Hewlett Packard sales representative.

Twisted Pair CAN Port

The CANSPIDER module features a 10-pin header connector that carries the galvanically isolated CAN bus interface. The interface is wired according to the ISO11898 /2/ definition. The power output in this connector is derived from the isolating DC/DC converter. The output is +5V DC and it is short circuit protected.

The pinout of this connector (facing the pins) is shown below:

9	7	5	3	1
I_GND	N.C.	I_GND	BUS_L	N.C.
N.C.	I_+5V	N.C.	BUS_H	I_GND
10	8	6	4	2

In this connector specification I_GND is the isolated ground and the I_+5V is the isolated power output. When making connections in twisted pair CAN networks you connect the BUS_H and BUS_L terminals together for all the nodes and terminate the bus at both ends with a 120 Ohm termination resistor.

Connection Procedure

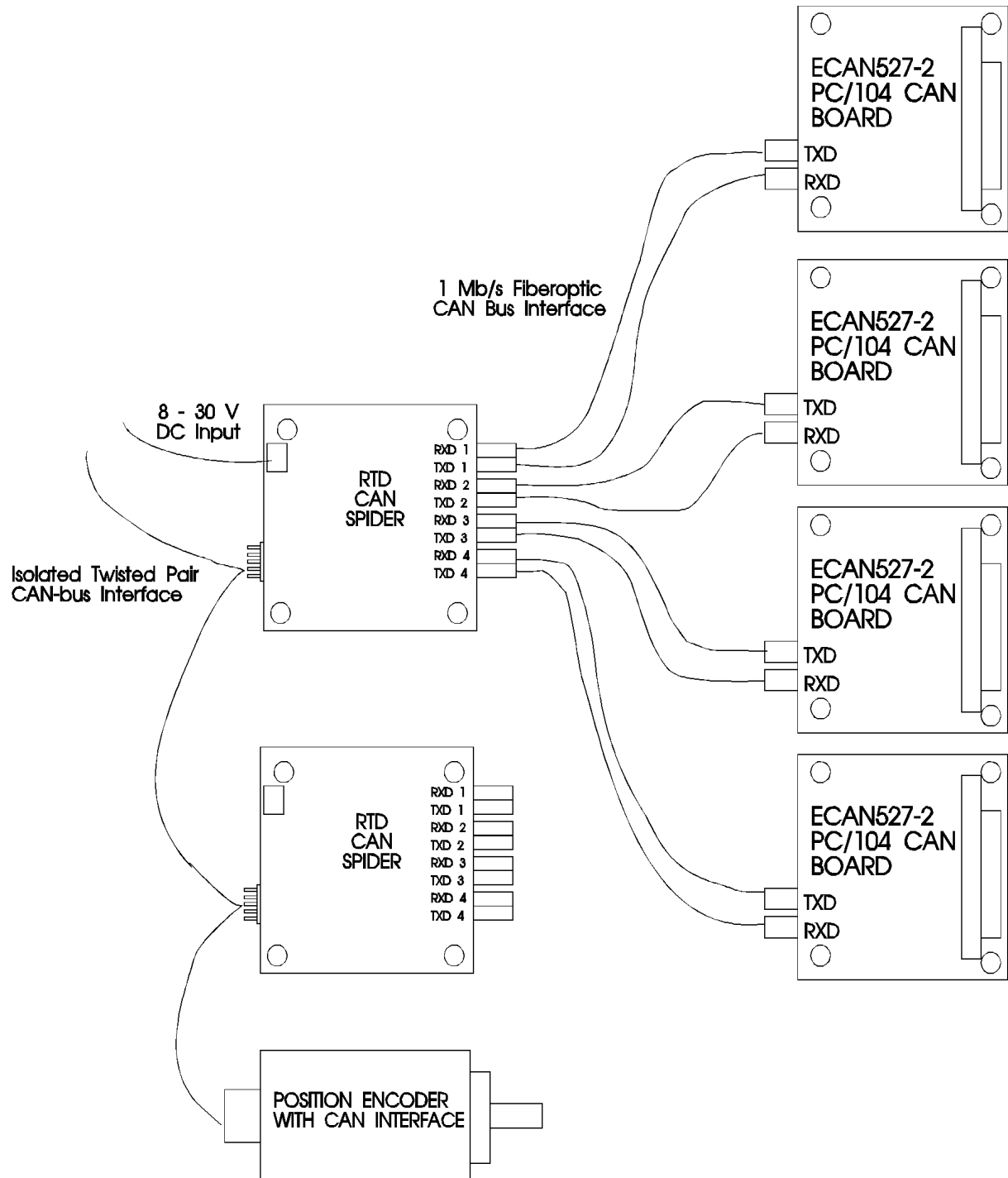
Please follow these steps when you set up your system:

- Set up your ECAN527-2 CAN interface boards in their PC/104 systems
- Connect the duplex fiberoptic cables to the ECAN527-2 modules: blue plug to blue socket and gray plug to gray socket.
- Connect the duplex fiberoptic cables to the CANSPIDER module ports: blue plug to blue socket and gray plug to gray socket.
- Make sure your power supply for the CANSPIDER provides a voltage between 8-30 VDC
- Power off the power supply that should power the CANSPIDER
- Wire the power supply to the CANSPIDER.
- Power up your ECAN527-2 systems as well as your CANSPIDER
- If no smoke appears you are in good shape. Now run the diagnostic software on your host CAN computers and make sure everything is working.

CAUTION: The power supply of the CANSPIDER is overvoltage protected with a 39V Zener diode as well as reverse polarity protected with a Schottky diode. These devices are designed to protect the CANSPIDER power supply from transients and spikes in automotive and industrial installations. They are not designed to withstand wrong polarity or overvoltage for indefinite periods of time.

Example system setup

The figure below illustrates a possible system configuration. Use the twisted pair CAN port to expand with multiple CANSPIDERS as well as other sensors or actuators with a CAN interface.



Power Supply Connections

The Real Time Devices CANSPIDER is designed to operate in standalone mode removed from the main computer. This module has an integrated wide input range power supply unit. The power supply system of the CANSPIDER consists of two DC/DC converters in series.

The first DC/DC converter is a non-isolated step-down DC/DC converter that converts a wide input range of 8-40V to +5V. The total output power of this stage is 25W, i.e. 5A of current. This output power rating can not be reached without adding a heat sink to the TO-220 DC/DC converter chip. The output of the step down converter is located at terminal block J3 next to the input terminal block. This output can be used to power other 5V devices in the system.

The output of the step down converter is connected to an isolated monolithic regulated DC/DC converter. This power unit supplies the onboard circuitry. It also provides power out from the CAN bus header as well as the screw terminal block J2 that is located close by. This DC/DC converter has a maximum output power of 3W. You may load this converter with 1.5W max. The output of this converter is short circuit protected to improve reliability.

Note:	Power wiring to the CANSPIDER must be sufficiently heavy to supply needed current without excessive voltage drop, or erratic operation or no startup may occur.
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Chapter 3 RETURN POLICY AND WARRANTY

Return Policy

If the module requires repair, you may return it to us by following the procedure listed below:

Caution: Failure to follow this return procedure will *almost always* delay repair! Please help us expedite your repair by following this procedure.

- 1) Read the limited warranty, which follows.
- 2) Contact the factory and request a Returned Merchandise Authorization (RMA) number.
- 3) On a sheet of paper, write the name, phone number, and fax number of a technically competent person who can answer questions about the problem.
- 4) On the paper, write a detailed description of the problem with the product. Answer the following questions:
 - Did the product ever work in your application?
 - What other devices were connected to the product?
 - How was power supplied to the product?
 - What features did and did not work?
 - What was being done when the product failed?
 - What were environmental conditions when the product failed?
- 5) Indicate the method we should use to ship the product back to you.
 - We will return warranty repairs by UPS Ground at our expense.
 - Warranty repairs may be returned by a faster service at your expense.
 - Non-warranty repairs will be returned by UPS Ground or the method you select, and will be billed to you.
- 6) Clearly specify the address to which we should return the product when repaired.
- 7) Enclose the paper with the product being returned.
- 8) Carefully package the product to be returned *using anti-static packaging!* We will not be responsible for products damaged in transit for repair.
- 7) Write the RMA number on the outside of the package.
- 8) Ship the package to:

Real Time Devices Finland Oy
Lepolantie 14
FIN-00600 Helsinki
FINLAND

Limited Warranty

Real Time Devices warrants the hardware and software products it manufactures and produces to be free from defects in materials and workmanship for one year following the date of shipment from REAL TIME DEVICES. This warranty is limited to the original purchaser of product and is not transferable.

During the one year warranty period, REAL TIME DEVICES will repair or replace, at its option, any defective products or parts at no additional charge, provided that the product is returned, shipping prepaid, to REAL TIME DEVICES. All replaced parts and products become the property of REAL TIME DEVICES. Before returning any product for repair, customers are required to contact the factory for an RMA number.

THIS LIMITED WARRANTY DOES NOT EXTEND TO ANY PRODUCTS WHICH HAVE BEEN DAMAGED AS A RESULT OF ACCIDENT, MISUSE, ABUSE (such as: use of incorrect input voltages, improper or insufficient ventilation, failure to follow the operating instructions that are provided by REAL TIME DEVICES, "acts of God" or other contingencies beyond the control of REAL TIME DEVICES), OR AS A RESULT OF SERVICE OR MODIFICATION BY ANYONE OTHER THAN REAL TIME DEVICES. EXCEPT AS EXPRESSLY SET FORTH ABOVE, NO OTHER WARRANTIES ARE EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND REAL TIME DEVICES EXPRESSLY DISCLAIMS ALL WARRANTIES NOT STATED HEREIN. ALL IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES FOR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE DURATION OF THIS WARRANTY. IN THE EVENT THE PRODUCT IS NOT FREE FROM DEFECTS AS WARRANTED ABOVE, THE PURCHASER'S SOLE REMEDY SHALL BE REPAIR OR REPLACEMENT AS PROVIDED ABOVE. UNDER NO CIRCUMSTANCES WILL REAL TIME DEVICES BE LIABLE TO THE PURCHASER OR ANY USER FOR ANY DAMAGES, INCLUDING ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, EXPENSES, LOST PROFITS, LOST SAVINGS, OR OTHER DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PRODUCT.

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